WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005AR79B

Title: The Ground Water Flow System in the Alluvial Aquifer of the Arkansas River at Dardanelle, Arkansas

Project Type: Research

Focus Categories: Groundwater, Models, Hydrogeochemistry

Keywords: Alluvial aquifer; Arkansas River; ground water; numerical modeling; hydrogeochemistry; resource management

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: $13,660

Non-Federal Matching Funds: $39,932

Congressional District: 3

Principal Investigator:
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Abstract

The Alluvial sediment along the Arkansas River in central Arkansas forms a discontinuous aquifer that, although limited in extent, is the most important aquifer in central Arkansas. At present this aquifer provides water supply for at least two communities, Dardanelle and Ozark, numerous irrigation farms, and a number of water-intensive industries. We propose to develop a numerical ground water model (MODFLOW) of a segment of this aquifer system in the vicinity of Dardanelle to improve understanding of the flow and chemical dynamics of this system. It is intended that this would be a start in modeling a series of such segments, with a goal of developing a large scale model that would be useful in future management and protection of this resource. A well-calibrated model would be useful in evaluating the potential impact of likely increases in water use, such as increased irrigation, municipal withdrawals, or industrial water use. Impacts that could be evaluated include influence on existing water-use systems and on parts of the natural ecological system that are hydrologically linked to the ground water system, such as wetlands. To develop this model, funds are requested for drilling monitoring wells in and around Dardanelle. Borehole logging during well drilling will provide data for an improved understanding of the stratigraphic framework

of the aquifer. The wells themselves will be used as observation wells for aquifer tests in which the city wells will be pumping wells, in order to determine hydraulic characteristics of the aquifer. The wells will also provide head calibration points for the model that will be developed. Chemical analyses of water samples from the monitoring wells will be used to understand the chemical evolution of water in the aquifer, and this understanding will provide additional model calibration parameters.